NASA Docket No. LAR 16307-1-SB *PATENT APPLICATION*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Jordan, Jeffrey D.; Schryer, David R. ; Davis, Patricia P.; Leighty, Bradley D.; Watkins, Anthony N.; Schryer, Jacqueline L.; and Oglesby, Donald M.

Application Filing Date: January 22, 2002

For: METHODOLOGY FOR THE EFFECTIVE STABILIZATION OF TIN-OXIDE-BASED OXIDATION/REDUCTION CATALYSTS

Assistant Commissioner for Patents
Washington, D.C. 20231
ATTENTION: Group Director

PETITION TO MAKE SPECIAL BECAUSE OF ENVIRONMENTAL QUALITY
(37 C.F. R. section 1.102(c) and M.P.E.P. section 708.02 IV)

Sir:

Petitioner respectfully requests that this application be accorded "special" status because it is for an invention that materially enhances the quality of the environment of mankind, by contributing to the maintenance of the basic life-sustaining material element air.

The accompanying statement by the Petitioner, the applicant's practitioner, explains how this invention contributes to the maintenance of this life-sustaining element. In light of this statement, Petitioner respectfully submits that the instant application is entitled to special status.

No fee is required with this petition, in accordance with 37 C.F.R. section 1.102(c).

WHEREFORE, Petitioner respectfully prays that this application be accorded "special" status.

Respectfully submitted,

1/22/02
Date

Helen M. Galus
Reg. No. 40,615
National Aeronautics and Space Administration
3 Langley Boulevard
Mail Stop 212
Hampton, VA 23681-2199
757-864-3227

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STATEMENTS UNDER 37 C.F.R. SECTION 1.102
IN SUPPORT OF PETITION TO MAKE SPECIAL

In support of the accompanying Petition to Make Special, Helen M. Galus, a Patent Attorney at NASA Langley Research Center Patent Counsel Office (LaRC PCO), and the attorney of record for the accompanying application, wishes to submit the following statements, on information and belief:

1. In response to the need for the next generation of catalysts for automotive applications, low-temperature oxidation catalysts were developed by NASA Langley Research Center. These improved catalysts are described in U.S. Patent Nos. 4,829,035; 4,839,330; 4,855,274; 4,912,082; 4,991,181; 5,585,083; 5,948,965; and 6,132,694. These catalysts exhibit several key advantages over the current state-of-the-art, however, the improved, low-temperature tin-oxide catalysts failed to maintain the minimum pollutant destruction levels following 5,000 and 10,000 mile simulated operation. Investigations reveal evidence of thermally induced reorganization that resulted in the reduced performance. Thus, despite the significant advancement of the improved catalysts over the current technology, these catalysts require greater thermal stability to extend durability.

2. The purpose of the present invention at issue herein is to significantly enhance the thermal stability of these existing low-temperature, oxidation/reduction catalyst, to thus extend their durability. The present invention serves to stabilize the tin oxide reducible metal-oxide coating by co-incorporating at least another metal-oxide species, such as zirconium. In at least one

embodiment, a third metal-oxide species is incorporated, selected from the group consisting of cerium, lanthanum, hafnium, and ruthenium.

3. The significant advancement of the improved catalysts over the current technology include the following advantages.

A. First, unlike the thick, inert layer of alumina used in conventional catalyst technology, the catalysts use a single active tin oxide coating (< 5 microns) that enhance the catalytic performance by acting as an oxygen storage device.

B. Second, their active washcoat reduces the temperature (i.e., light off) at which the catalyst begins converting toxic to nontoxic gases, as well as, requiring less precious metal to attain the same toxic gas conversion efficiency over time.

C. Third, these catalysts are capable of capturing enough oxygen from the natural exhaust stream to complete the chemical reactions. Unlike traditional catalytic converter technology, external air sources and the ancillary sensors, air pumps, and hoses are not required for catalytic converter operation. Finally, their catalytic formulation is a unique combination of precious metal and promoter chemistries that render it 25 – 40% less expensive in material cost per gram and less dependent on expensive materials like platinum, palladium, or rhodium than current technologies.

I hereby declare that all statements made herein of my own knowledge are true and that statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. Sec. 1001; and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Respectfully submitted,

1/22/02
Date

Helen M. Galus
Reg. No. 40,615